# APPENDICES

# Appendix A. Detailed Park Information

## EUGENE O'NEILL NATIONAL HISTORIC SITE (EUON)

Eugene O'Neill National Historic Site was established in 1976 to honor the only Nobel Prize winning playwright from the United States and the architect of modern American Theater. O'Neill lived at this location in the hills above Danville from 1937 to 1944 in the Tao House. It was here that he wrote his final and most successful plays. EUON encompasses 13 acres of historical buildings, gardens, and orchards. It is adjacent to several hundred acres of protected lands of the Briones State Park.

Four management objectives are related to natural resources:

1. Achieve an understanding of the natural ecosystem existing on the site prior to the O'Neill's arrival and the remnants of that ecosystem today.
2. Enhance conservation efforts of Las Trampas Regional Wilderness area surrounding the site.
3. Contain or eliminate non-native invasive plants,
4. Evaluate the risk for and manage out-breaks of Sudden Oak Death.

Several inventories were done. The open grassy field down-slope of the pool and NPS offices provided the primary location for information about the natural resources. Meandering over the remaining site helped surveyors gather additional data. The vascular plant survey was conducted in this manner. The array and camera for the terrestrial vertebrate inventory were located in the open grassy field. Landbird point count stations were in the open grassy field and up near the impoundment. An acoustic bat station was placed in the barn. No map is included.

## FORT POINT NATIONAL HISTORIC SITE (FOPO)

Fort Point National Historic Site is managed by Golden Gate National Recreation Area. It was designated as a National Historic Site in 1970 and consists of 29 acres bordering the mouth of San Francisco Bay at the south side of the Golden Gate Bridge. The Fort was constructed between 1853 and 1861 to prevent entrance of a hostile fleet into San Francisco Bay. Today the site receives over 1.5 million visitors a year. Fort Point is noteworthy for native and several rare and endemic plant species that cling to the precipitous slopes above the Fort. Intermittent freshwater seeps at the Fort support the rare San Francisco fork-tailed damselfly. The site includes the waters of San Francisco Bay within ¼ mile of the shore. This area serves as an important wintering location for thousands of terns, loons, grebes, and cormorants. Recreational fishing and crabbing are popular resource dependent activities at Fort Point.

Several inventories were completed at FOPO. The coastal biological resources survey mapped the coastline and described biotic associations. The site was covered by the vegetation mapping project led by PORE. Wintering waterbirds and shorebirds were inventoried. See the GOGA central map for FOPO, located under the Golden Gate Bridge and then east approximately ¼ of a mile. It is bounded to the south by the highway.

**GOLDEN GATE NATIONAL RECREATION AREA (GOGA)**

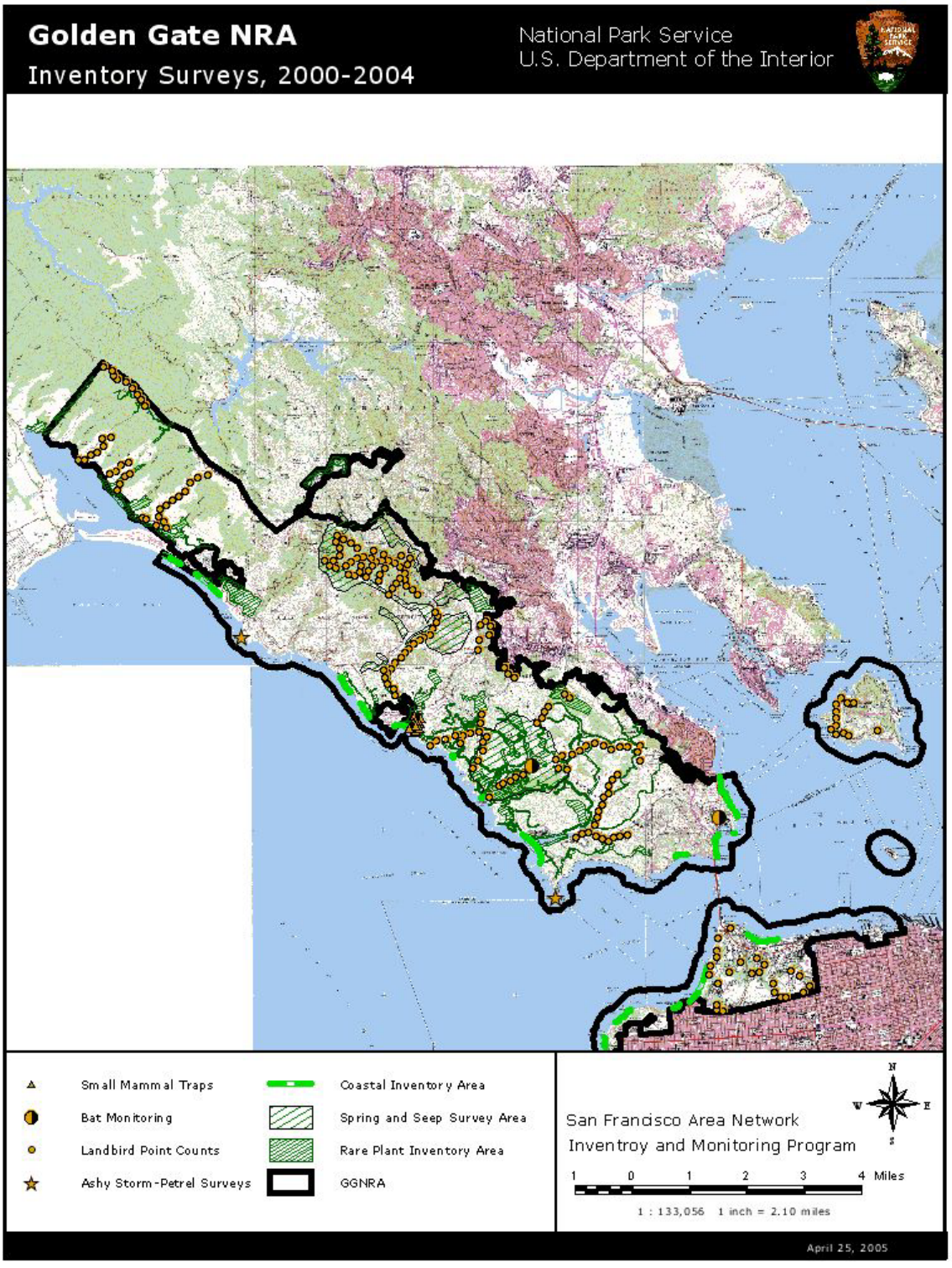
Golden Gate National Recreation Area comprises approximately 75,000 acres of coastal land and 8,799 acres of marine subtidal habitat. This includes the mouth of San Francisco Bay, one of the largest ports in the United States. GOGA was established in 1972 as part of the "parks to the people" program. The enabling legislation stated that the lands were preserved "for public use and enjoyment certain areas… possessing outstanding natural, historic, scenic and recreational values…" The Golden Gate Bridge and entrance to the Bay divide the long, narrow park into the northern Marin County lands and the southern San Francisco and San Mateo County lands. The legislative boundary encompasses Alcatraz Island and all of the coastal watersheds south and east of Point Reyes National Seashore, including Mt. Tamalpais, Samuel P. Taylor, Angel Island, and Tomales Bay State Parks. In addition, the park has a scenic and recreational easement over the 20,000-acre San Francisco Watershed lands. The 52.7 miles of shoreline varies from steep rock to sandy cobble pocket beaches. GOGA leases submerged and tidal lands along the open coast and within the San Francisco Bay from the State of California. GOGA is bordered by two National Marine Sanctuaries and is part of the Central California International Biosphere Reserve, a UNESCO program.

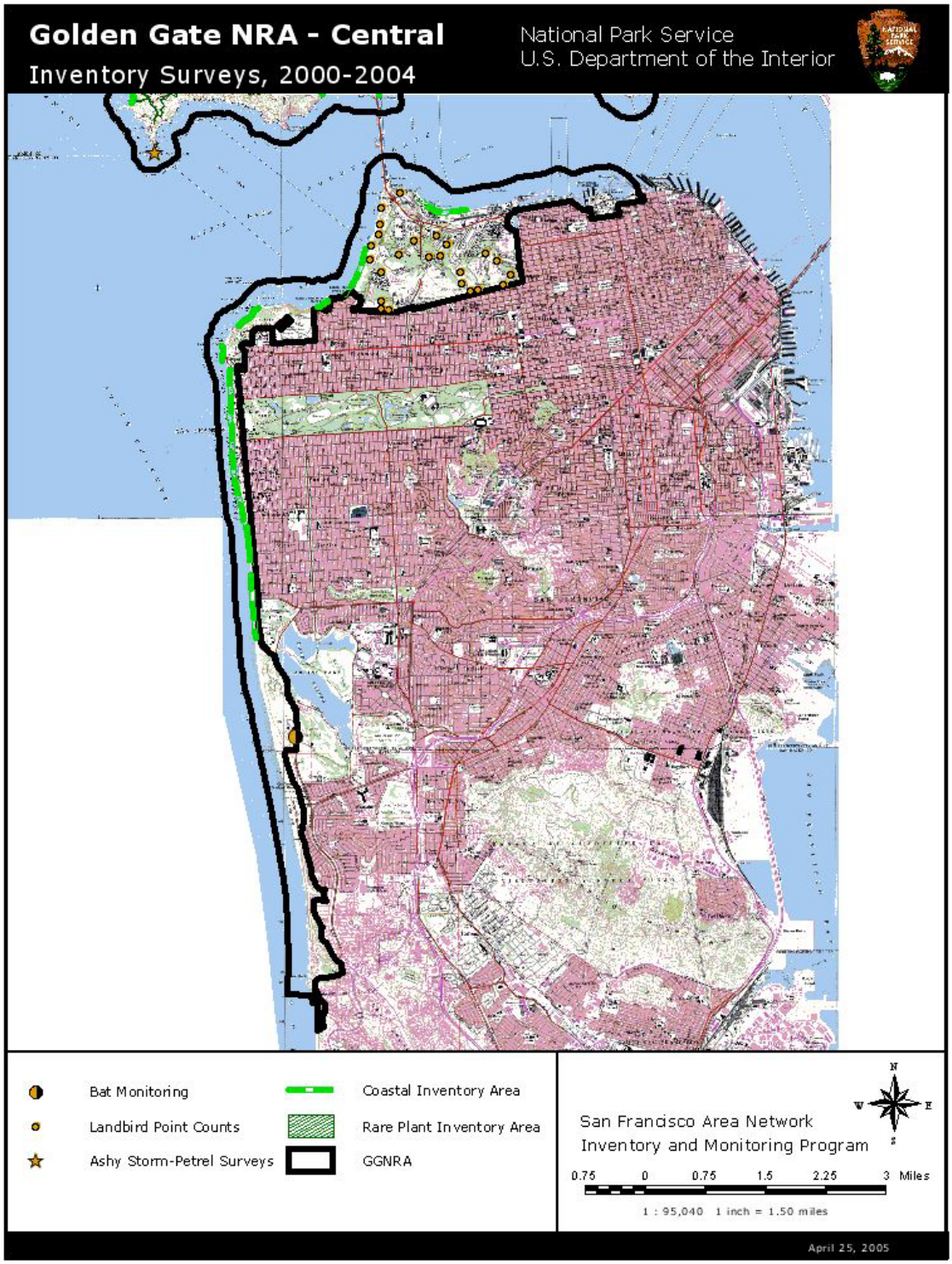
The complex geology, topography, and microclimates of GOGA support a diverse array of native habitats, flora, and fauna. The high degree of threat to these resources is a result of the park's juxtaposition within the urban landscape and the extensive urban/wildland interface. Invasive species are one of the most significant threats to the long-term sustainability of the native ecosystems. Limiting the impacts of intense human use is a constant challenge.

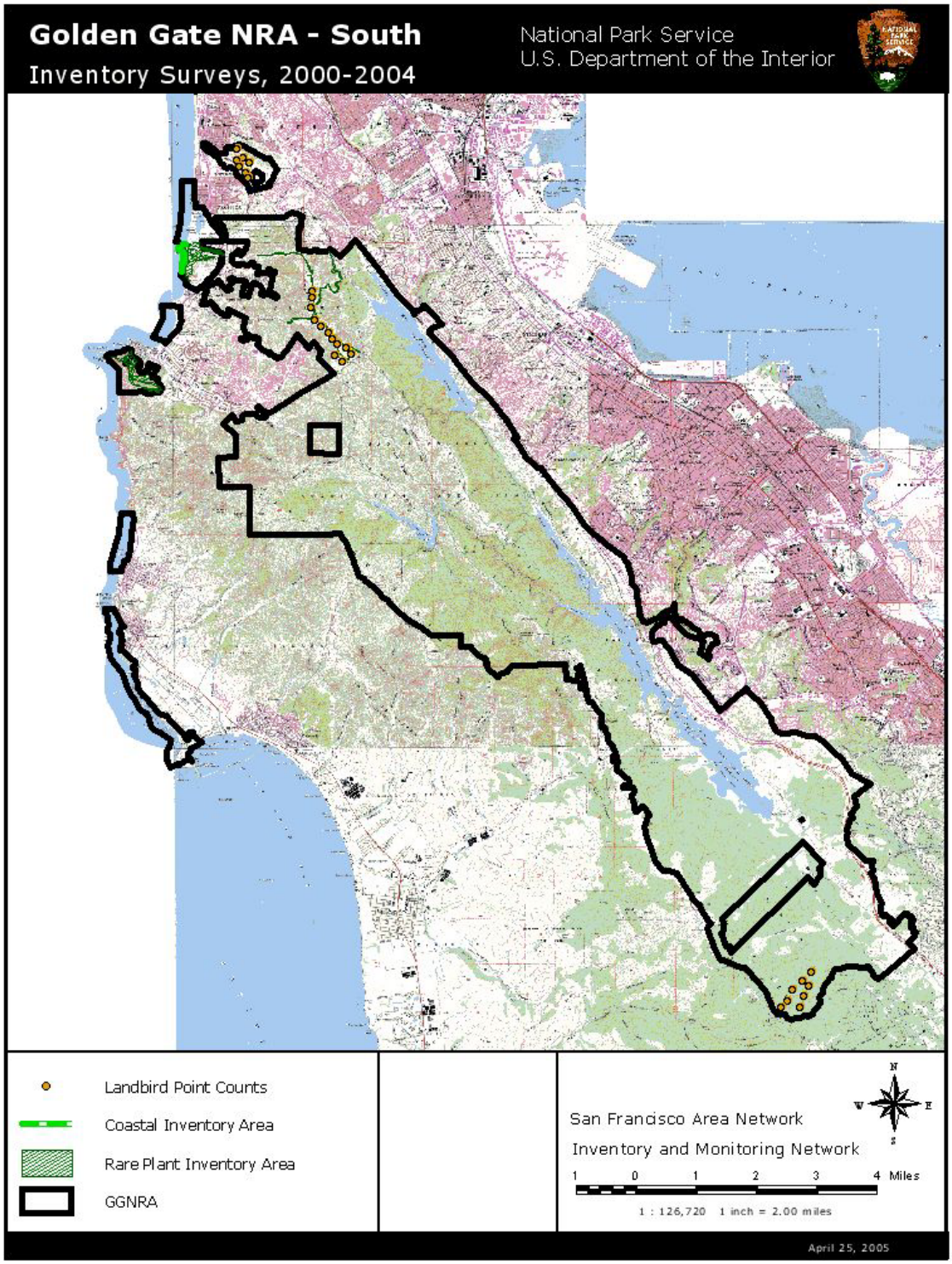
Five management objectives relate to natural resources:

1. Maintain the primitive and pastoral character of the parklands in northern Marin County.
2. Maintain and restore the character of natural lands by maintaining the diversity of native park plant and animal life.
3. Identify and protect threatened and endangered species, marine mammals, and other sensitive natural resources.
4. Control exotic plants and check erosion whenever feasible.
5. Locate development in areas previously disturbed by human activity whenever possible.

Several inventories were conducted on GOGA lands. The vegetation mapping project led by PORE covered GOGA administered lands. During wetland mapping, seeps and springs were identified. Special surveys for mice at Big Lagoon, freshwater shrimp, and the Tidewater goby provided baseline information for the areas surveyed. Coastal biological resources were mapped and described. Maps are found on the following three pages.


Golden Gate NRA
Inventory Surveys, 2000-2004
National Park Service
U.S. Department of the Interior
Small Mammal Traps
Bat Monitoring
Landbird Point Counts
Ashy Storm-Petrel Surveys
Coastal Inventory Area
Spring and Seep Survey Area
Rare Plant Inventory Area
GGNRA
San Francisco Area Network
Inventroy and Monitoring Program
1 0 1 2 3 4 Miles
1 : 133,056 1 inch = 2.10 miles
April 25, 2005


Golden Gate NRA - Central
Inventory Surveys, 2000-2004
National Park Service
U.S. Department of the Interior
Bat Monitoring
Landbird Point Counts
Ashy Storm-Petrel Surveys
Coastal Inventory Area
Rare Plant Inventory Area
GGNRA
San Francisco Area Network
Inventory and Monitoring Program
0.75 0 0.75 1.5 2.25 3 Miles
1 : 95,040 1 inch = 1.50 miles
April 25, 2005


Golden Gate NRA - South
Inventory Surveys, 2000-2004
National Park Service
U.S. Department of the Interior
Landbird Point Counts
Coastal Inventory Area
Rare Plant Inventory Area
GGNRA
San Francisco Area Network
Inventory and Monitoring Network
1 0 1 2 3 4 Miles
1 : 126,720 1 inch = 2.00 miles
April 25, 2005

**JOHN MUIR NATIONAL HISTORIC SITE (JOMU)**

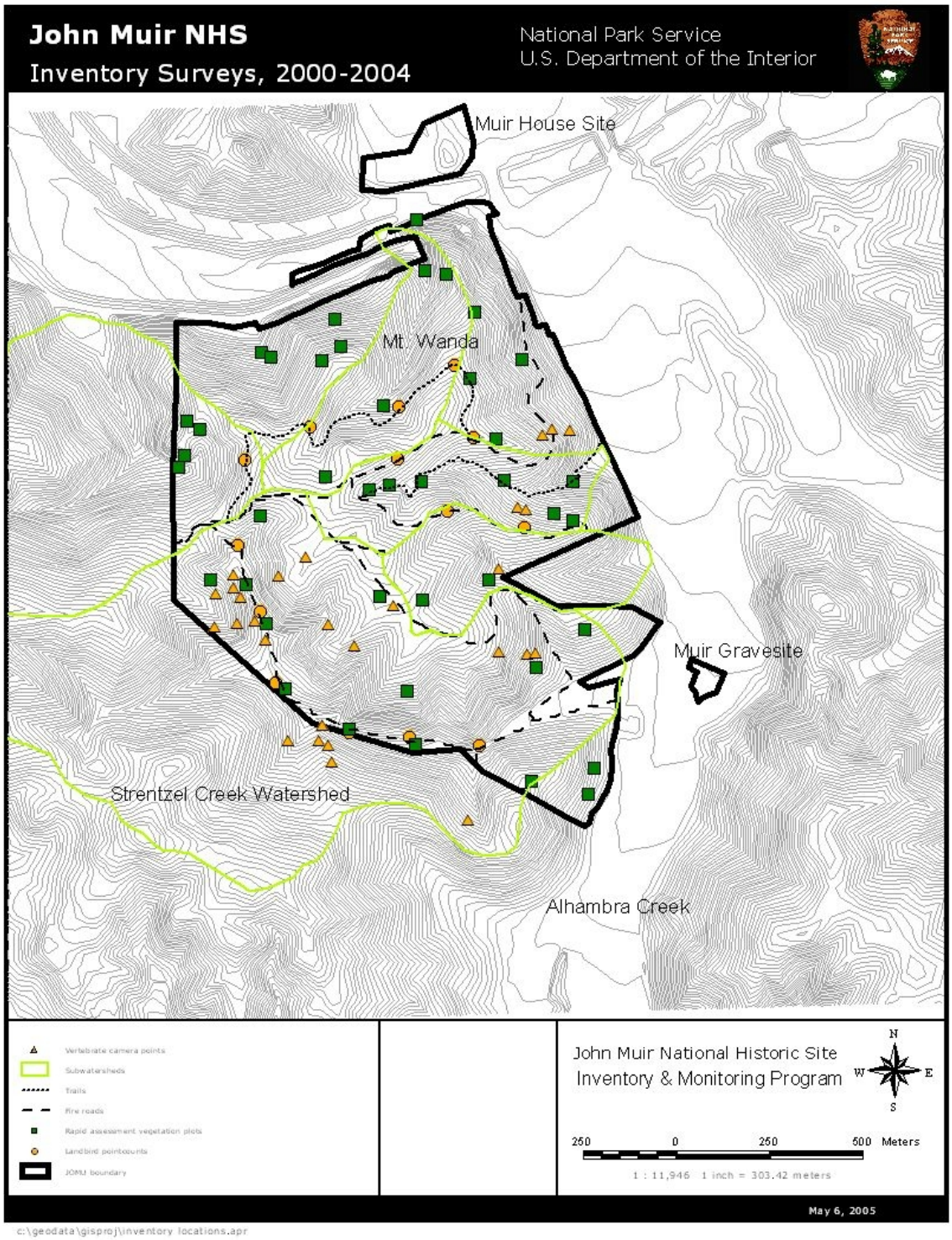
John Muir National Historic Site was set aside in August 1964 as a national memorial to the preservationist, John Muir. Located in Martinez, JOMU is part of the rapidly expanding urban, suburban industrial San Francisco Bay area complex. It encompasses 345 acres, 8.9 acres of which include the house area and adjacent ranch where John Muir made his home. This area of the park includes buildings, orchards, a vineyard, and the park visitor center. JOMU recently acquired 1.3 acres including Muir's gravesite next to the Alhambra Creek. This area includes an historic pear orchard and nine family graves.

The adjacent Mt. Wanda area (326 acres) is the major natural area of the park. It is characterized by grassland and oak woodland habitats and contains the remnant of another historic fruit orchard. After heavy rains, an ephemeral stream drains down Strentzel canyon into Alhambra Creek. Franklin Creek abuts the north boundary of the park and the Alhambra Creek meanders on the east side of the Muir gravesite. Threats to resources include the effects of long-term fire suppression, accelerated erosion in disturbed areas, non-native species invasions, and lack of basic ecological data.

Management objectives were predominantly for maintaining the historic scene associated with John Muir's days at the ranch, but there were four objectives for the natural area on Mt. Wanda:

1. Identify, monitor, and manage the flora and fauna of the Mt. Wanda area.
2. Protect sensitive species.
3. Manage human and feral animal impacts on park natural resources.
4. Contain or eliminate non-native invasive plants.

No previous recent natural resource surveys had been conducted; therefore, all inventories provided baseline data. All studies were done on Mt. Wanda. The survey of vascular plants and collection of plants for the herbarium led to vegetation mapping. A survey of oak regeneration and search for trees displaying Sudden Oak Death symptoms was conducted. Non-native plants were mapped for elimination or management. Surveys for landbirds, terrestrial vertebrates, bats, bees, butterflies, and moths were conducted. The map is on the next page.

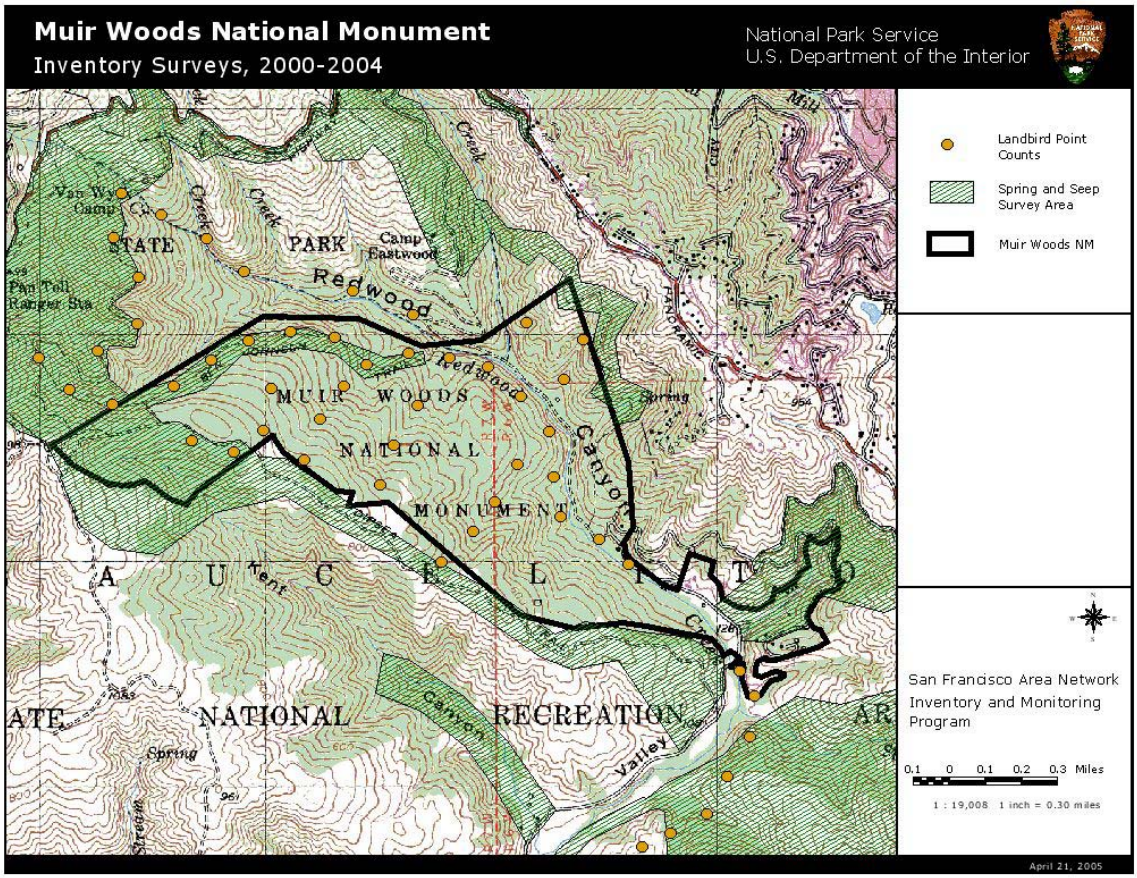

John Muir NHS
Inventory Surveys, 2000-2004
National Park Service
U.S. Department of the Interior
Muir House Site
Mt. Wanda
Muir Gravesite
Strentzel Creek Watershed
Alhambra Creek
Vertebrate camera points
Subwatersheds
Trails
Fire roads
Rapid assessment vegetation plots
Landbird pointcounts
JOMU boundary
John Muir National Historic Site
Inventory & Monitoring Program
N
W
E
S
250 0 250 500 Meters
1 : 11,946 1 inch = 303.42 meters
May 6, 2005
c:\geodata\gisproj\inventory locations.apr

**MUIR WOODS NATIONAL MONUMENT (MUWO)**

Muir Woods National Monument was established in 1908 by this proclamation: "An extensive growth of redwood trees (*Sequoia sempervirens*) embraced in said land is of extraordinary scientific interest and importance because of the primeval character of the forest in which it is located, and the character, age and size of the trees, are hereby preserved from appropriation and use of all kinds under public land laws of the United States…". Located in Marin County, it is only 17 miles north of San Francisco. The Monument encompasses only 554 acres, but receives nearly one and a half million visitors a year. It is administered by GOGA.

The dominant vegetation is old-growth redwood growing in uneven-aged stands with trees ranging up to 800 years old within a mosaic of Douglas-fir, hardwood, scrub, and grassland. The largest trees are within the flood plain of Redwood Creek. The old-growth habitat harbors four federally listed species and many additional rare or sensitive species. The hydrologic system has been disturbed by past development as well as recreational use. This has altered the stream course, the amount of overland flow, and the quantity and quality of aquatic habitat.

The inventory data is critical to planning and the long-term sustainability of this isolated fragment of old-growth redwoods. Numerous inventories preceded the servicewide Inventory, including landbird, salmonids and bats.. A vegetation map, part of the PORE project, is now available. Seeps and springs and biota that use them were located and documented. GOGA's management objectives apply to MUWO as well.



**PINNACLES NATIONAL MONUMENT (PINN)**

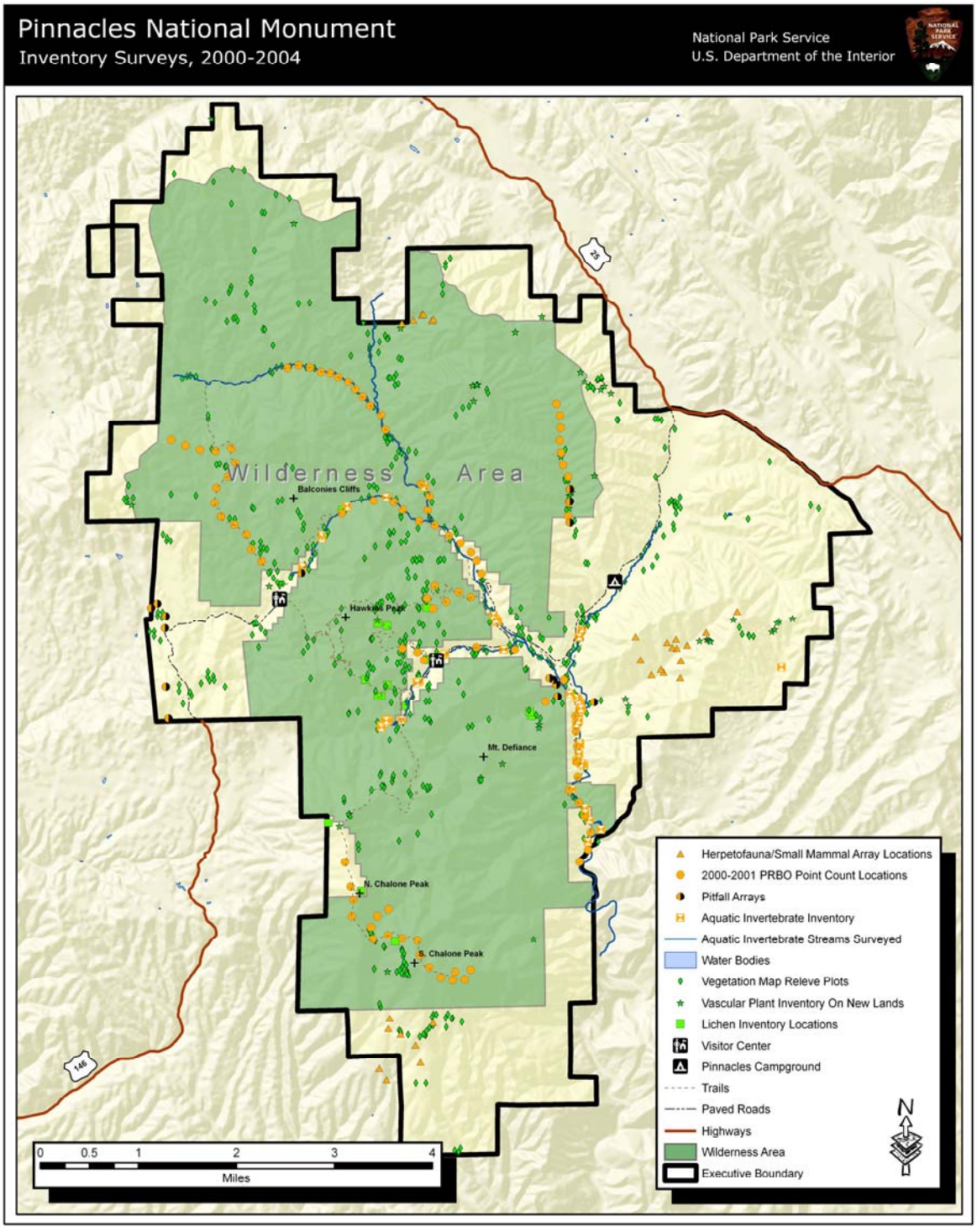
Pinnacles National Monument occupies 24,000 acres in Monterey and San Benito Counties, 40 miles inland from the Pacific Ocean. PINN was decreed a Monument in 1908 to protect its unique assortment of rocks, cliffs, and caves formed by ancient volcanic activity. In January 2000, the park grew by nearly 8,000 acres as it acquired adjacent lands from the Bureau of Land Management. Approximately 75% of PINN is congressionally designated wilderness with an additional 10% designated as potential wilderness. Nearly six million people live within a 100-mile radius of the park, making it easily accessible to people living in the major California metropolitan centers of San Francisco and Los Angeles.

PINN lies at the southern end of the Gabilan Mountains and is a refuge for many species. Species richness is high. Recent investigations recorded 410 different bee species and a strong migrant bird population using the park in early spring. The broadleaf chaparral ecoregion supports abundant populations of vegetation and wildlife representing a high degree of biodiversity. Years of fire suppression and adjacent land management practices have altered wildlife habitat and migration corridors making it difficult to sustain populations of large predators. Threats to the park include non-native species invasions and displacement of native species. The immediate area around the park is rapidly being converted into vineyards, so groundwater water quantity and quality and migratory corridors may be affected.

Six management objectives were appropriate for natural resources and necessary inventories:

1. Maintain the primitive character of the wilderness.
2. Preserve natural ecologic and geologic processes (e.g. fire, flood, mass wasting).
3. Maximize native species, assemblages, communities, and ecosystems across a variety of temporal and spatial scales.
4. Provide for the scientific study of natural processes and species.
5. Recognize and allow for the natural range of variability while promoting ecosystem resilience.
6. Control and eradicate, when practical, non-native species.

The expansion of the park has included habitat types that were not represented in the core area. These new lands were relatively unstudied. A vascular plant, terrestrial vertebrate and bird inventories were conducted. The vegetation map is currently being redone and includes the new lands. A survey of the important riparian ecosystem included fish, herpetofauna and invertebrates. The map can be found on the following page.


Pinnacles National Monument
Inventory Surveys, 2000-2004
National Park Service
U.S. Department of the Interior
Wilderness Area
Balconies Cliffs
Hawkins Peak
Mt. Defiance
N. Chalone Peak
S. Chalone Peak
25
146
0 0.5 1 2 3 4
Miles
Herpetofauna/Small Mammal Array Locations
2000-2001 PRBO Point Count Locations
Pitfall Arrays
Aquatic Invertebrate Inventory
Aquatic Invertebrate Streams Surveyed
Water Bodies
Vegetation Map Releve Plots
Vascular Plant Inventory On New Lands
Lichen Inventory Locations
Visitor Center
Pinnacles Campground
Trails
Paved Roads
Highways
Wilderness Area
Executive Boundary
N

**POINT REYES NATIONAL SEASHORE (PORE)**

Point Reyes National Seashore, located in Marin County, is approximately 40 miles northwest of San Francisco. Established by Congress in 1962, this geologically unique peninsula encompasses 71,046 acres of sandy beaches, coastal cliffs and seastacks, marine terraces, coastal uplands of mixed grassland, coastal scrub, mixed hardwood/Douglas-fir forests, and stands of the rare Bishop pine. It includes 22,000 acres of estuarine and marine waters. PORE is migrating northward along the San Andreas Fault. Approximately 19,000 acres of the park have been retained in agricultural production. This pastoral zone includes six active dairies and beef cattle grazing. In 1976, Congress designated 32,000 of PORE as wilderness. The marine environment drives the climate of PORE and significantly adds to the abundance and diversity of wildlife. The 84.2 miles of jagged shoreline is the ecotone between the terrestrial and marine ecosystems. PORE is the center of one of five coastal upwelling marine ecosystems in the world. Adjacent waters are rich in nutrients and support an abundant fishery.

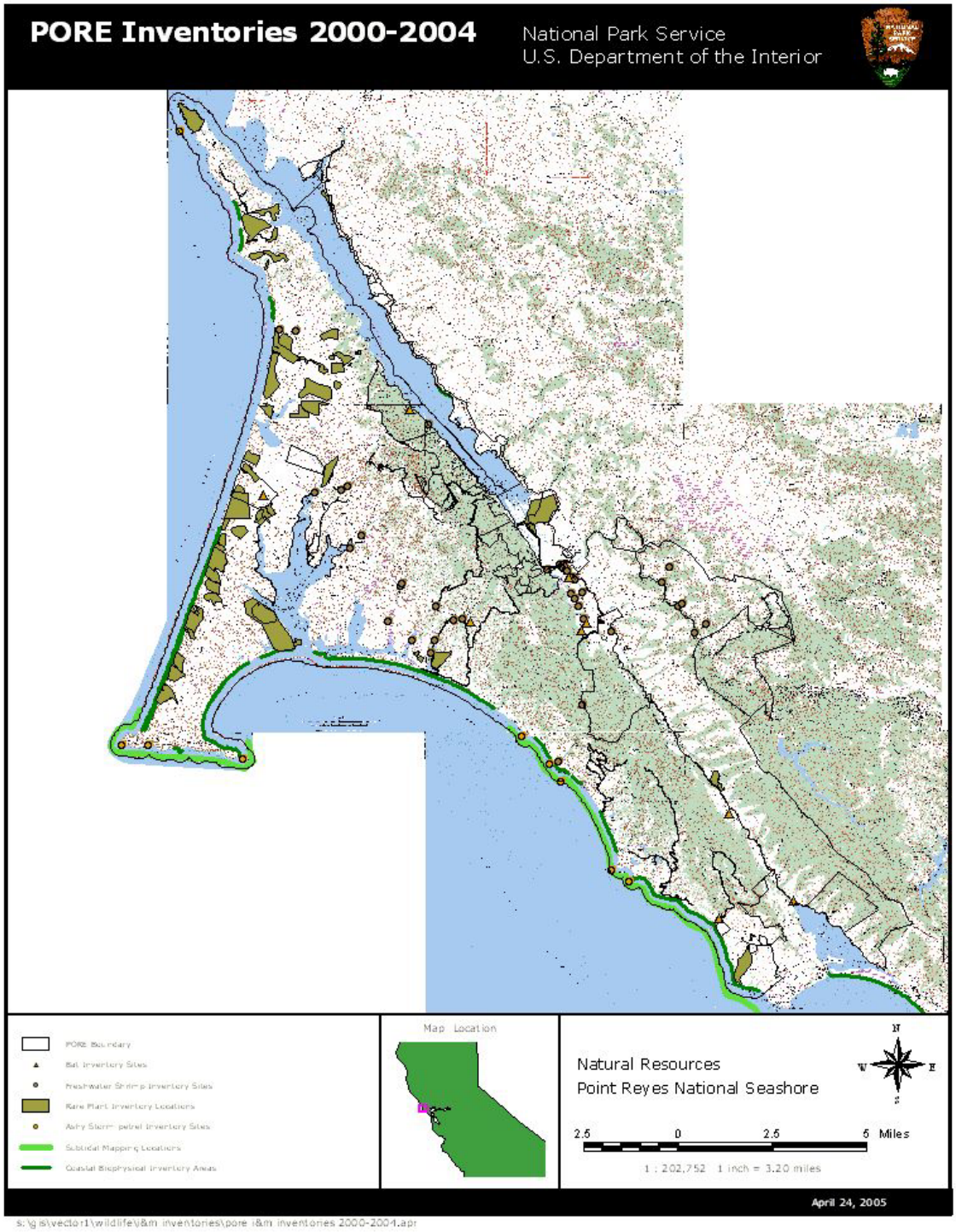
The Point Reyes Headlands Reserve and the Estero de Limantour Reserve are within the Seashore boundary and are partially administered by the California Department of Fish and Game in the regulation of fisheries. Additionally, the California State Water Resources Control Board designated four "Areas of Special Biological Significance" within the Seashore: Bird Rock, Point Reyes Headlands, Double Point, and Duxbury Reef. Similar to GOGA, PORE is bordered by two National Marine Sanctuaries and is part of the Central California Biosphere Reserve. PORE administers the northern lands of GOGA north of Bolinas Lagoon, approximately 20,000 acres.

As with GOGA, invasive species are one of the most significant threats to the long-term sustainability of the park's native ecosystems. The juxtaposition and proximity to a major urban population makes the Seashore's resources accessible to a large number of people.

Seven management objectives related to the natural resources:

1. Identify, protect, and perpetuate the diversity of existing ecosystems, which are representative of the California seacoast.
2. Preserve and manage wilderness.
3. Protect marine mammals, threatened and endangered species, and other sensitive natural resources found within the Seashore.
4. Retain research natural area status for the Estero de Limantour and the Point Reyes Headlands.
5. Manage Seashore activities in the coastal, pastoral and estuarine areas in a manner compatible with resource carrying capacity.
6. Enhance knowledge and expertise in ecosystem management through research and experimental programs that provide sound scientific information to guide management relating to wildlife, prescribed burning techniques, exotic plant and animal reduction, regulation and control of resource use, and pollution control.
7. Monitor mariculture operations.

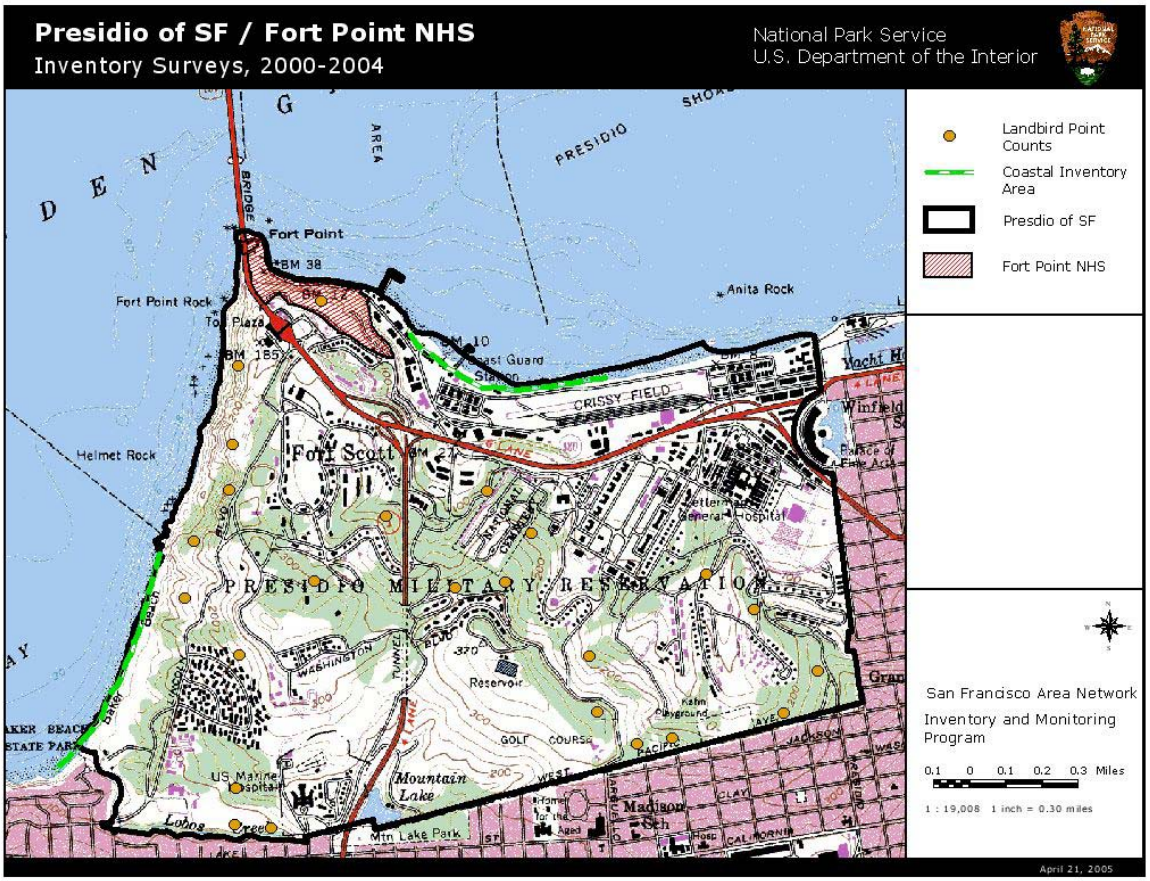
Vascular plant inventories had been partially completed, so the park completed the ground truthing of the vegetation map and concentrated on inventories of rare plant populations and wetlands. The park recognized the need for a current, accurate vegetation map, and initiated a mapping project with GOGA, PRES, MUWO and FOPO in 1994, and the inventory program assisted with its completion beginning in 1996. Waterbird and shorebird inventories were also conducted with I&M funds in 1998-99. Terrestrial vertebrates, bats, birds, coastal resources, and subtidal mapping were the most important field surveys that were done. The map is on the following page.


PORE Inventories 2000-2004
National Park Service
U.S. Department of the Interior
PORE Boundary
Bat Inventory Sites
Freshwater Shrimp Inventory Sites
Rare Plant Inventory Locations
Ashy Storm- petrel Inventory Sites
Subtidal Mapping Locations
Coastal Biophysical Inventory Areas
Map Location
Natural Resources
Point Reyes National Seashore
N
W
E
S
2.5 0 2.5 5 Miles
1 : 202,752 1 inch = 3.20 miles
April 24, 2005
s:\gis\vector1\wildlife\i&m inventories\pore i&m inventories 2000-2004.apr

**PRESIDIO OF SAN FRANCISCO (PRES)**

The Presidio of San Francisco (PRES) was established in 1962 and became part of GOGA in 1994. Since 1998, PRES has been jointly managed by the National Park Service and the Presidio Trust, a special public-private governmental agency. It is tasked with managing most of the buildings and making the park financially self-sufficient by 2013. The PRES encompasses 1,480 acres, more than 500 historic buildings, a collection of coastal defense fortifications, a national cemetery, an historic airfield, and 300 acres of historic forests, beaches, native plant habitats, coastal bluffs and the newly restored Crissy Field tidal wetland and coastal dunes. Eleven rare or endangered plants inhabit the dune and serpentine areas of the park. Community-based restoration efforts may expand the extent and diversity of native habitat. Invasive non-native plants and unnaturally elevated populations of native wildlife, such as skunks and raccoons, pose a significant threat to PRES natural resources. Located in San Francisco, intense human use also takes a toll of the fragmented natural resources.

The map of central GOGA depicts the inventories done at the PRES which is generally the land area just south and east of the Golden Gate Bridge. Landbirds and rare plants were surveyed. Waterbirds and shorebirds were surveyed along with GOGA, PORE and FOPO in 1998-1999. Coastal biological resources at Crissy Field were also surveyed. As with the rest of GOGA, PRES lands were covered by the vegetation mapping project.



# Appendix B: Definition of Terms and Acronyms

**Attributes** are any living or non-living feature or process of the environment that can be measured or estimated and that provide insights into the state of the ecosystem.

**Biological diversity** is the variety of life and the processes that govern life. There are four major components of biological diversity:

Genetic – a variation of genes within a species,
Species – variation of the kinds of plants and animals,
Community – variation of the ways in which the many associations of plants and animals aggregate into interacting groups, and
Process – variation in the physical, chemical, and biological forces to which biotic and abiotic resources respond

**BLM** is the Bureau of Land Management, a federal agency.

**CESU** refers to a Cooperative Ecosystems Study Unit, NPS representation at an academic institution allowing access to scientists and programs at multiple institutions.

**Ecological (ecosystem) integrity** is a concept that expresses the degree to which the physical, chemical, and biological components of an ecosystem are present, functioning, and capable of self-renewal. It implies the presence of appropriate species, populations, and communities, and the occurrence of ecological processes at appropriate rates and scales.

**Ecosystem** is defined as, "a spatially explicit unit of the Earth that includes all of the organisms, along with all components of the abiotic environment within its boundaries" (Likens 1992).

**Ecosystem management** is the process of land and water use decision making and management practices that take into account the full suite of organisms and processes that comprise the ecosystem. It is based on the best understanding currently available as to how the ecosystem works. It includes a primary goal of sustainability of ecosystem structure and function, recognition that ecosystem are spatially and temporally dynamic, and acceptance of the dictum that ecosystem function depends on ecosystem structure and diversity.

**EUON** is the acronym for Eugene O'Neill National Historic Site park unit.

**FOPO** is the acronym for Fort Point National Historic Site park unit.

**GIS** means geographic information system and usually refers to a digital spatial relational database and the maps and tables produced from it.

**GOGA** is the acronym for Golden Gate National Recreation Area park unit.

**GPS** is a geographic positioning system using a device that uses satellites and triangulation to determine a precise location on earth.

**I&M** refers specifically to the National Park Service Inventory and Monitoring program.

**Indicators** are a subset of monitoring attributes that are particularly information-rich. Their values are somehow indicative of the quality, health, or integrity of the larger ecosystem to which they belong (Noon 2002).

**Inventory** is the process of acquiring, managing, and analyzing information on park resources, including but not limited to the presence, distribution, abundance, and condition of plants, animals, soil, water, air, natural features, biotic communities, and natural processes.

**JOMU** is the acronym for John Muir National Historic Site park unit.

**LIDAR** means light detection and ranging and refers to the aerial measurement of coastline location by bouncing light off the ground and measuring the rate of return.

**Mitigation** is the maintenance of the existing form and integrity of natural systems or system components in the face of harm or potential harm from human activities. It also refers to the conversion of a resource, altered by human activity, to a more functional or natural state.

**Monitoring** is defined as the systematic collection and analysis of resource data at regular intervals in order to predict or detect natural and human-induced changes, and to provide the basis for appropriate management response.

**MUWO** is the acronym for Muir Woods National Monument park unit.

**Native species** is defined by the NPS as a species that occurs and evolves naturally without human intervention of manipulation.

**Natural resource** is defined by the NPS as those features and values including native plants and animals, water, air, soils, topographic features, geologic features, paleontologic resources, natural quiet, and clear night skies.

**Non-native** refers to a species of plant or animal that is not native to the regional ecosystem of interest and is defined by the NPS as a species that enters an area with the aide of human intervention. Exotic, non-native, introduced, and alien are synonymous terms.

**NPS** refers to the National Park Service, a federal agency in the U.S. Department of Interior.

**PCSLC** is the acronym for the Pacific Coast Science and Learning Center, an NPS supported center to promote and facilitate research and education about science in the national parks.

**PI** stands for principle investigator, the primary person doing the inventory.

**PINN** is the acronym for Pinnacles National Monument park unit.

**Population** is a group of individuals of a species that are geographically close enough together to share a common gene pool and can and do interbreed.

**PORE** is the acronym for Point Reyes National Seashore park unit.

**PRBO** is the acronym for Point Reyes Bird Observatory Conservation Science.

**PRES** is the acronym for the Presidio of San Francisco park unit.

**RAMSAR** refers to the UNESCO Convention on Wetlands signed in Ramsar, Iran, 1971, which supports studies to stem alarming disappearance of rich, complex wetland ecosystems.

**Research** is the investigation aimed at the discovery and interpretation of facts, the revision of accepted theories in light of new facts, or the development of practical applications of such new revised theories.

**Servicewide** refers to the national NPS program offices, goals, and objectives.

**SFAN** is the NPS acronym for the San Francisco Bay Area Network of eight parks (EUON, FOPO, GOGA, JOMU, MUWO, PINN, PORE, and PRES) formed by the I&M program to facilitate studies and partnerships.

**Spatial integration** involves establishing linkages of measurements made at different spatial scales within a park or network of parks.

**Temporal integration** involves establishing linkages between measurements made at various temporal scales, usually requiring nesting more frequent sampling within the context of less frequent sampling.

**TESA** is the acronym for *Texosporium sancti-jacobi*, a lichen on the global red list of endangered lichens.

**UNESCO** refers to the United Nations Educational, Scientific, and Cultural Organization. The United States is a member. UNESCO encourages international peace and universal respect by promoting collaboration through studies.

**USGS-BRD** is the acronym for the United States Geological Survey, Biological Resources Division, and is a federal agency in the U.S. Department of Interior.

**Vital signs**, as used by the NPS, are the subset of indicators chosen by a park or network as measurable features of the environment that provide insights into changes in the state of the ecosystem.

# Appendix C. NPSpecies Data

This Appendix contains the specific data for the NPSpecies database that was populated over the 5-year Natural Resource Challenge funding.

Table 24 shows the number of species by taxon in the Network parks for which we have documented evidence of presence. Voucher specimens were the best evidence followed by a study report. The number of species thought to be present at the beginning of the 5-year program are listed under the "Pre-I&M 10/1/2000" columns and represent the pre-Natural Resource Challenge information base. The Year 5 10/1/2004" columns indicate the number of species with documented evidence of presence at the end of the five years. The last column indicates the number of species added to our information base over the 5-years of inventory funding.

Table 24. Evidence for species presence.

| | **Number of pieces of evidence in NPSpecies** | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| Taxa by | **Vouchers** | | | **Records** | | | **Observations** | | | EVID. |
| Park | pre-2000 | post-04 | added | pre-2000 | post-04 | added | pre-2000 | post-04 | added | ADDED |
| **EUON totals** | **0** | **5** | **5** | **0** | **5** | **5** | **0** | **5** | **5** | **15** |
| Vasc.plants | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | |
| Amphibians | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | |
| Reptiles | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | |
| Birds | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | |
| Mammals/ bats | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | |
| **FOPO totals** | **0** | **48** | **48** | **9** | **13** | **4** | **183** | **440** | **257** | **309** |
| Non-vasc.plants | 0 | 15 | 15 | 1 | 2 | 1 | 0 | 0 | 0 | |
| Vasc.plants | 0 | 24 | 24 | 8 | 10 | 2 | 183 | 363 | 180 | |
| Fish | 0 | 6 | 6 | 0 | 0 | 0 | 0 | 72 | 72 | |
| Birds | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 4 | 4 | |
| Mammals/ bats | 0 | | 1 | 0 | 0 | 0 | 0 | 1 | 1 | |
| **GOGA** | **0** | **208** | **208** | **73** | **256** | **152** | **467** | **4738** | **4263** | **4623** |
| Non-vasc.plants | 0 | 32 | 32 | 0 | 11 | 11 | 0 | 0 | 0 | |
| Vasc.plants | 0 | 4 | 4 | 1 | 42 | 12 | 467 | 4292 | 3817 | |
| Invertebrates | 0 | 0 | 0 | 3 | 30 | 27 | 0 | 15 | 15 | |
| Amphibians | 0 | 8 | 8 | 6 | 13 | 7 | 0 | 1 | 1 | |
| Reptiles | 0 | 8 | 8 | 6 | 13 | 6 | 0 | 4 | 4 | |
| Fish | 0 | 58 | 58 | 9 | 51 | 41 | 0 | 82 | 82 | |
| Birds | 0 | 72 | 72 | 35 | 65 | 30 | 0 | 334 | 334 | |
| Mammals/ bats | 0 | 26 | 26 | 13 | 31 | 18 | 0 | 10 | 10 | |
| **JOMU totals** | **0** | **461** | **461** | **4** | **11** | **7** | **0** | **17** | **17** | **485** |
| Vasc.plants | 0 | 461 | 461 | 2 | 3 | 1 | 0 | 0 | 0 | |
| Invertebrates | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | |
| Amphibians | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | |
| Reptiles | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | |
| Fish | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | |
| Birds | 0 | 0 | 0 | 2 | 4 | 2 | 0 | 15 | 15 | |
| Mammals/ bats | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 1 | 1 | |
| **MUWO** | **0** | **136** | **136** | **13** | **23** | **10** | **0** | **1** | **1** | **147** |
| Non- | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | |

| | Number of pieces of evidence in NPSpecies | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| Taxa by | Vouchers | | | Records | | | Observations | | | EVID. |
| Park | pre-2000 | post-04 | added | pre-2000 | post-04 | added | pre-2000 | post-04 | added | ADDED |
| vasc.plants | | | | | | | | | | |
| Vasc.plants | 0 | 129 | 129 | 1 | 4 | 3 | 0 | 0 | 0 | |
| Amphibians | 0 | 5 | 5 | 2 | 3 | 1 | 0 | 0 | 0 | |
| Reptiles | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | |
| Fish | 0 | 1 | 1 | 1 | 3 | 2 | 0 | 0 | 0 | |
| Birds | 0 | 0 | 0 | 4 | 7 | 3 | 0 | 1 | 1 | |
| Mammals/ bats | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | |
| **PINN** | **1** | **409** | **408** | **27** | **49** | **22** | **0** | **1** | **1** | **431** |
| Non-vasc.plants | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Vasc.plants | 0 | 384 | 384 | 1 | 4 | 3 | 0 | 0 | 0 | |
| Invertebrates | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | |
| Amphibians | 1 | 1 | 0 | 7 | 10 | 3 | 0 | 0 | 0 | |
| Reptiles | 0 | 0 | 0 | 4 | 7 | 3 | 0 | 0 | 0 | |
| Fish | 0 | 0 | 0 | 1 | 3 | 2 | 0 | 0 | 0 | |
| Birds | 0 | 5 | 5 | 6 | 11 | 5 | 0 | 0 | 0 | |
| Mammals/ bats | 0 | 19 | 19 | 8 | 13 | 5 | 0 | 1 | 1 | |
| **PORE** | **0** | **2229** | **2229** | **103** | **172** | **75** | **16** | **12913** | **12897** | **15201** |
| Non-vasc.plants | 0 | 16 | 16 | 0 | 3 | 3 | 0 | 0 | 0 | |
| Vasc.plants | 0 | 2130 | 2130 | 19 | 38 | 19 | 0 | 12819 | 12819 | |
| Invertebrates | 0 | 3 | 3 | 0 | 7 | 7 | 0 | 23 | 23 | |
| Amphibians | 0 | 1 | 1 | 2 | 4 | 2 | 0 | 0 | 0 | |
| Reptiles | 0 | 2 | 2 | 1 | 4 | 3 | 0 | 0 | 0 | |
| Fish | 0 | 9 | 9 | 5 | 23 | 18 | 0 | 31 | 31 | |
| Birds | 0 | 47 | 47 | 47 | 61 | 14 | 16 | 36 | 20 | |
| Mammals/ bats | 0 | 21 | 21 | 29 | 32 | 9 | 0 | 4 | 4 | |
| **PRES** | **0** | **305** | **305** | **12** | **60** | **48** | **0** | **11539** | **11539** | **11892** |
| Non-vasc.plants | 0 | 41 | 41 | 0 | 1 | 1 | 0 | 0 | 0 | |
| Vasc.plants | 0 | 217 | 217 | 6 | 28 | 22 | 0 | 11370 | 11370 | |
| Invertebrates | 0 | 0 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | |
| Amphibians | 0 | 4 | 4 | 1 | 3 | 2 | 0 | 0 | 0 | |
| Reptiles | 0 | 5 | 5 | 1 | 3 | 2 | 0 | 0 | 0 | |
| Fish | 0 | 10 | 10 | 1 | 3 | 2 | 0 | 1 | 1 | |
| Birds | 0 | 15 | 15 | 2 | 10 | 8 | 0 | 166 | 166 | |
| Mammals/ bats | 0 | 13 | 13 | 1 | 5 | 4 | 0 | 2 | 2 | |
| **TOTALS** | **1** | **3801** | **3800** | **241** | **589** | **323** | **666** | **29654** | **28980** | **33103** |

The following table provides a comparison to evaluate the progress made by the SFAN in developing park species lists over the five years of the Natural Resource Challenge funding. The upper table is from the Inventory Study Plan and represents the 2000 baseline. The time period for the lower section is the end of FY04 with the number of species listed in NPSpecies at that time.

The number of species in the NPSpecies database grew by 43%. The most progress was made through additions of plant taxa (2,791) followed by bird taxa (530). Over the 5-years, the fish taxon grew the most (82%).

Table 25. Total number of species records in NPSpecies (pre-5/2000) and post-9/2004).

| **PRE-** | Park: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Taxon | EUON | FOPO | GOGA | JOMU | MUWO | PINN | PORE | PRES | Total |
| Vasc.plants | 0 | | 1376 | 341 | 297 | 720 | 922 | | 3656 |
| Amphibians | 0 | | 18 | 0 | 5 | 13 | 11 | | 47 |
| Reptiles | 0 | | 34 | 0 | 6 | 29 | 17 | | 86 |
| Fish | 0 | | 32 | 0 | 3 | 3 | 28 | | 66 |
| Birds | 0 | | 384 | 76 | 89 | 155 | 448 | | 1152 |
| Mammals/ bats | 0 | | 69 | 0 | 39 | 59 | 81 | | 248 |
| Totals | 0 | 0 | 1913 | 417 | 439 | 979 | 1507 | 0 | **5255** |

| **POST-** | Park: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Taxon | EUON | FOPO | GOGA | JOMU | MUWO | PINN | PORE | PRES | Total |
| Vasc.plants | 200 | 296 | 1917 | 624 | 354 | 641 | 1457 | 958 | 6447 |
| Amphibians | 1 | 0 | 22 | 5 | 8 | 15 | 15 | 17 | 83 |
| Reptiles | 5 | 0 | 43 | 5 | 12 | 32 | 26 | 28 | 151 |
| Fish | 0 | 47 | 163 | 1 | 5 | 6 | 108 | 38 | 368 |
| Birds | 51 | 22 | 464 | 97 | 88 | 165 | 502 | 293 | 1682 |
| Mammals/ bats | 18 | 1 | 112 | 24 | 41 | 60 | 141 | 51 | 448 |
| Totals | 275 | 366 | 2721 | 756 | 508 | 919 | 2249 | 1385 | **9179** |